Introduction to Value Stream Mapping & Management

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Value and Lean - Major Principles

Waste = <u>Unnecessary</u> Non-Added Value

-- Scrap, rework, waiting for batches, unneeded space/items/etc

-- People are NOT waste—they ARE the most versatile resource

Value is Ultimately Defined by the End Customer

-- Operators, maintainers, “emergency” folks, etc--Not just buyers

Identify the Value Stream (VS)

-- All steps in product creation, from first idea/action to end user

-- Work Backwards from End User Needs, to Beginning of VS

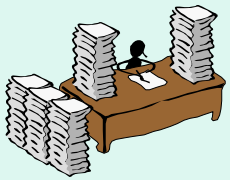
Make Value Flow Eliminate waste, Minimize non added-value, so that the item moves easily, from one value creating step to the next

Let Customers PULL Value from Producer

-- Don’t make then Push product along without a clear rqmt./signal from the next step- schedule by demand rather than forecasts

Strive for Perfection (at VS level, Avoid optimizing individual steps)

Lean: Wasteful / Not Added-Value Conditions



Over-Production

Underused TALENTS

Over-Processing

Many Cost, . Quality, Schedule Controls focus Only on Defect-causing "fabrication" -Which is the TIP of the waste ICEBERG !!

Excess Inventory

DEFECTS

Waiting

Six Sigma Focus

Transport

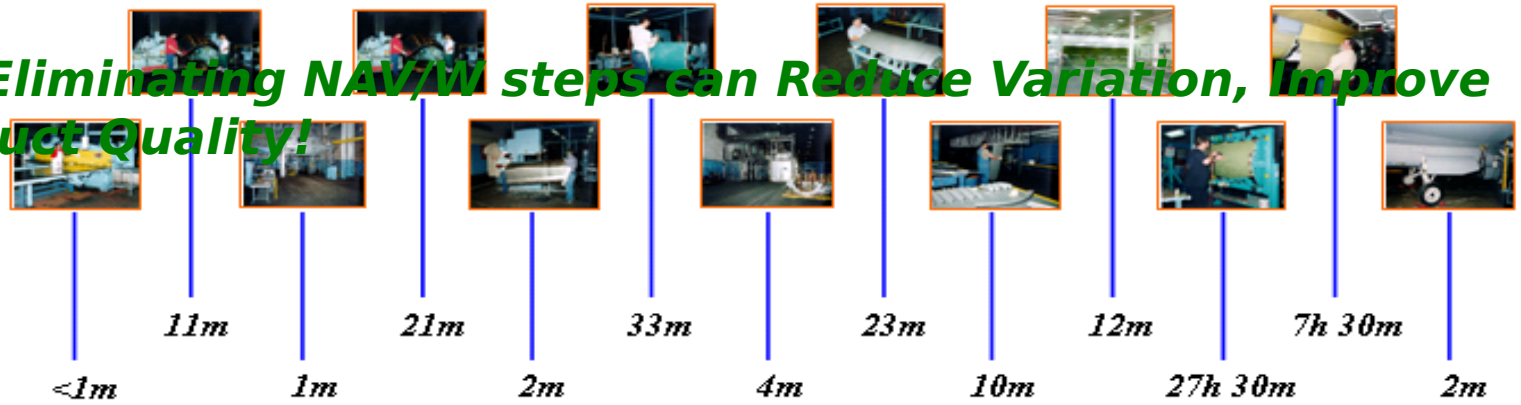
Motion

Sources: Toyota, MIT

Lean, Value, Variation & Quality – F-16 MLG Door

Defect-causing Process Variations Occur in the many Not-Added Value / Wasteful (NAV/W) steps, Not Just in the fewer Value Added steps.

SO, Eliminating NAV/W steps can Reduce Variation, Improve Product Quality!



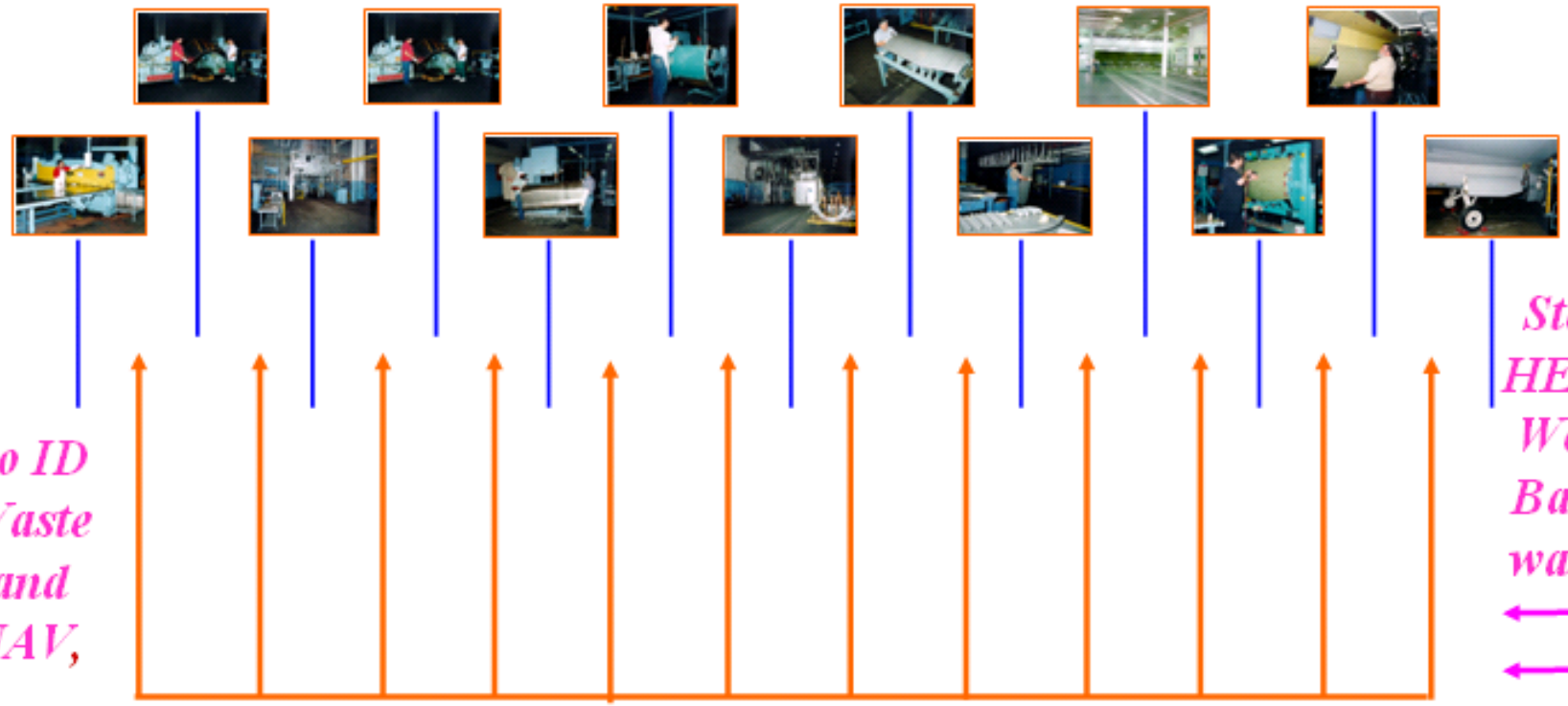
Total Value-Added Time = 37 Hours

Initial Total Time Span = 14 Months

Total Span Now = < 10 months, Target: < 6 months!

Source: Lockheed Martin, Fort Worth TX

Value and Lean: A Process is "Lean" IF it: Reduces Non Added-Value; Eliminates Waste; and Provides High-Quality Value Timely, Less Costly EVEN WHEN CHANGES IN VALUE OCCUR FREQUENTLY



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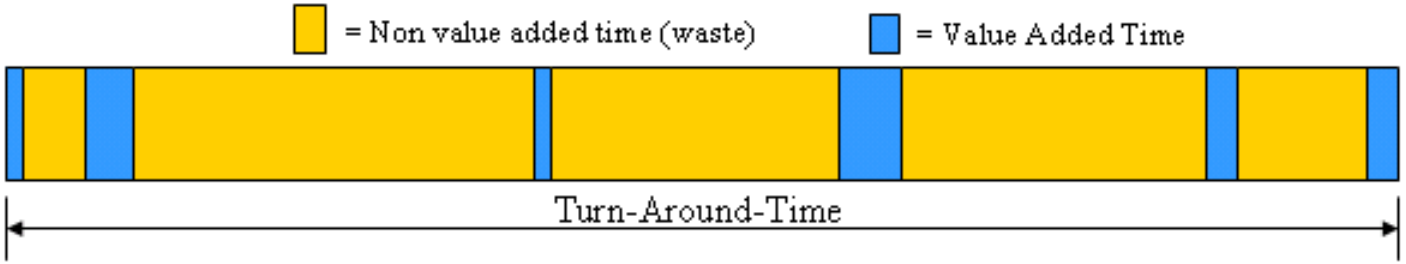
LEAN SIX SIGMA
There is a difference!

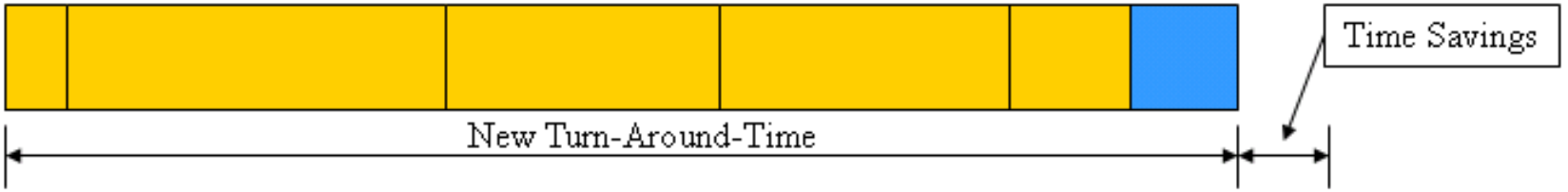
What makes **Lean Six Sigma** different?

Time equals money – What is the customer willing to pay for?



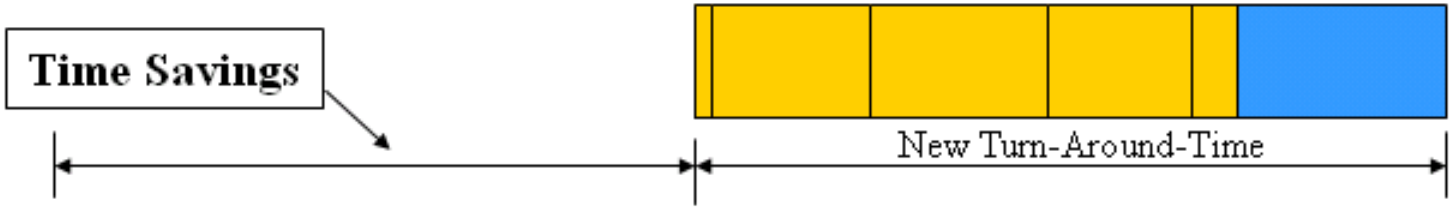
Value Added Time is only a very small percentage of the Total Turn-Around-Time.

TRADITIONAL PROCESS IMPROVEMENT RESULTS



Traditional Improvements and Cost Savings typically focus on only the Value Added activity.

Lean Six Sigma PROCESS IMPROVEMENT RESULTS



Best Method: Target "Non-Value" FIRST, then Six Sigma the "Value Added"

What is Value Stream Mapping (VSM) ?

VSM comes from Toyota process flow improvement tools, as expanded by the Lean Enterprise Institute. It involves:

A. Identifying (up to) All steps currently involved in providing a Product (Good or Service), from:

- **-- Idea to Reality**
- **-- Raw Substances to Finished Product**
- **-- *Product Delivery to Final Disposal***

B. Determining the Materiel *and Information* Functional flows associated with each step

C. Evaluating which steps add value to the end item customer, and which are just pure Waste or are Necessary but non-added value (NAV)

D. Developing a new Functional flow plan that eliminates Waste steps and reduces NAV steps

Sources: Lean Thinking by Womack & Jones,

Learning to See, by Rother & Shook

VSM: Getting Started

- Identify your boundaries--start/end points, the Product Family you want to map, and the Value Stream Manager/Mapper for that Family

- Gather the basic/key Information (Customer Needs, Process Measures, Supplier inputs)

- Lay out Process Steps on Paper in a simplified Visual Functional Flow, using Common Symbols

- Look for ways to cut/combine Steps to improve Flow, enable Pull, to Reduce Waiting & Inventory

Guidance for Identifying Boundaries

1. ***START*** **Simple: "Door to Door" within One facility (i.e. key materiel In from a supplier(s), product Out to a customer)—*Nothing Less, or you are Sub-optimizing***

2. **Pick ONE Product Family, that is "representative" or "typical". The Waste you find will Also be "typical"!**

   -- A Product Family: normally defined as "use of several common processes to create multiple items"

3. **Identify/Create A Value Stream Manager/Mapper: the person Responsible for that Product Family**

Guidance for Info Gathering / Mapping

1. Work "***Upstream***", i.e. Start with Customer Rqmts, Then Process Inputs/Actions/Outputs, then Supplier(s) Inputs to Your Facility

2. The VSM/their <u>own</u> Small "cadre" Walks the factory floor during a "typical" period(s), gathers Current "slice in time" information

3. Information Gathering/Mapping Tools: Paper, Pencils (w/good Erasers), Stop-Watch/Calendar.

4. Information Sources: **VSM** Observations (***NOT*** Shop Chiefs' Data, or Trends, or Averages, or Ideals, or post-Disasters)

5. Protocol: Tell floor operators in Advance what and why you are mapping, encourage them to provide inputs, suggestions, Changes to your map. This is NOT "time & motion" or "prep for downsizing" !!

Common Information Types

Cycle Time (C/T)

Changeover Time (C/O)

Uptime

Number of Operators

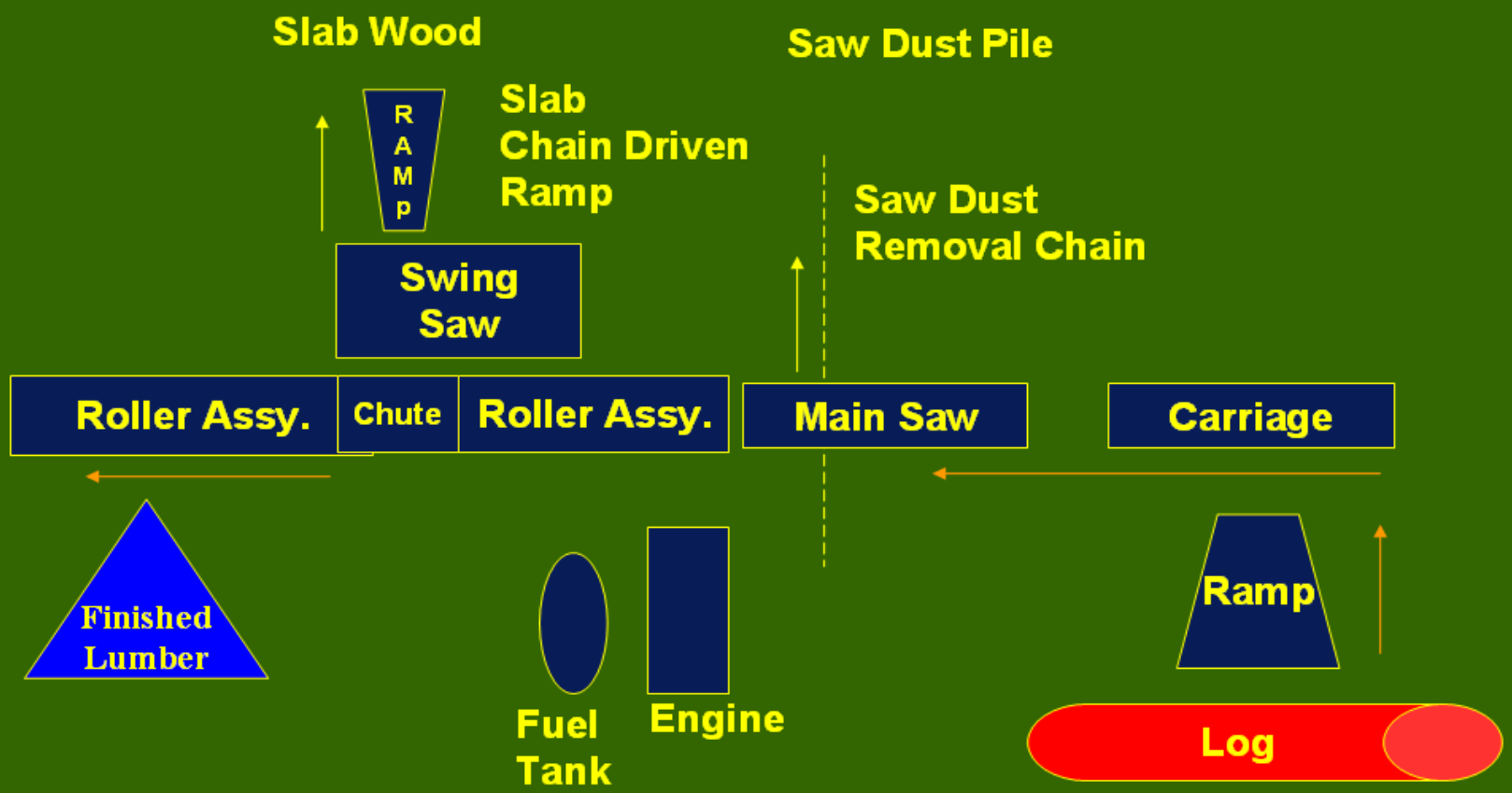
Number of product Variations

Pack Size

Working Time (Minus Breaks)

Scrap Rate

TM Saw-Mill Physical Layout



TM Saw-Mill Functional Flow – Current State Value Stream Map

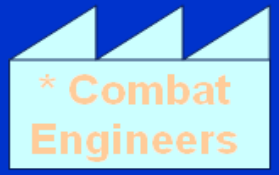
Start with a clean blank sheet of Paper,
and an Pencil with a good Eraser

TM Saw-Mill Functional Flow – Current State Value Stream Map

The End Item Users of the Finished Lumber
Write their Needs, Desires, and Metrics

*USAF Red Horse, US Army Combat Engineers, USN Construction Battalions

TM Saw-Mill Functional Flow – Current State Value Stream Map



Work Backwards from Customer Needs, Map All Process Steps, Metrics, and Inventories

Swing Saw	Main Saw	Carriage
On Demand Machine Up Time 95%	On Demand Machine Up Time 90%	Max Length 23 Ft. Cycle Time 15 Sec. Final Cut Min. 2 in.

1 1 1 1

I

One Day's Production

Raw Materials
5 Day Supply

I

Indicates Operator

*USAF Red Horse, US Army Combat Engineers, USN Construction Battalions

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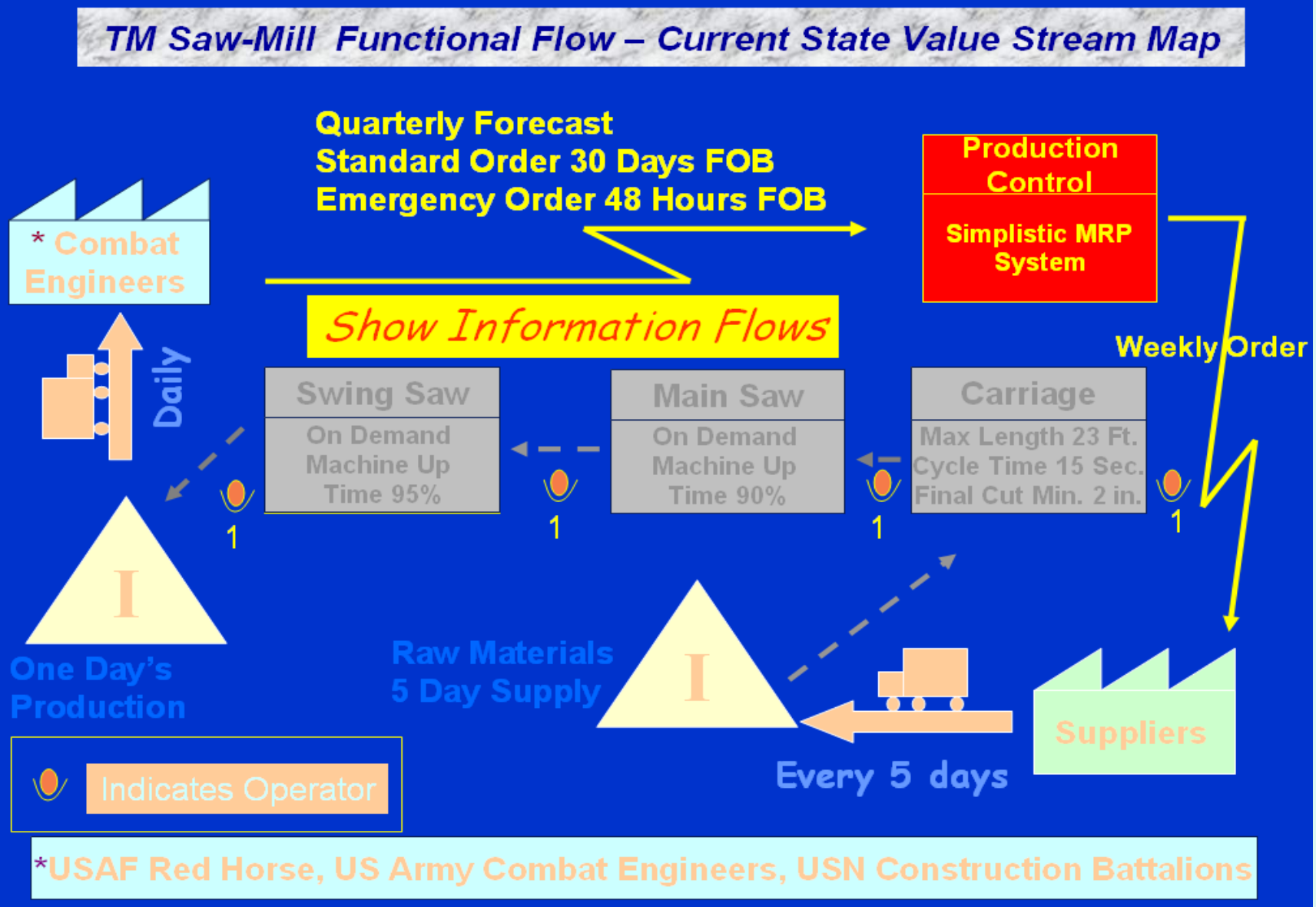

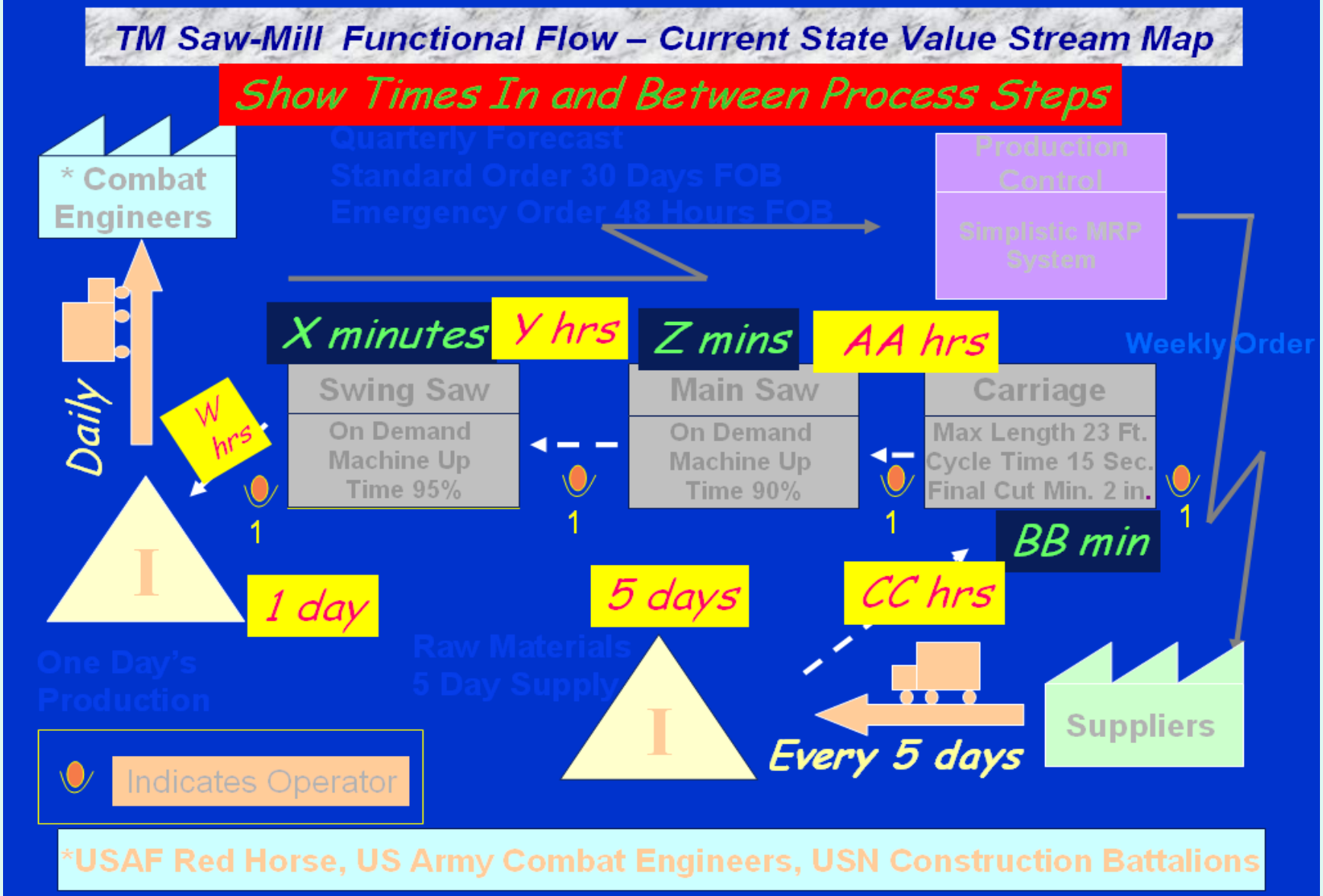
TM Saw-Mill Functional Flow – Current State Value Stream Map
Show Times In and Between Process Steps
* Combat Engineers
Quarterly Forecast
Standard Order 30 Days FOB
Emergency Order 48 Hours FOB
Production Control
Simplistic MRP System
Weekly Order
Daily
W hrs
X minutes
Y hrs
Z mins
AA hrs
Swing Saw
On Demand Machine Up Time 95%
Main Saw
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Carriage
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5 Day Supply
One Day's Production
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Suppliers
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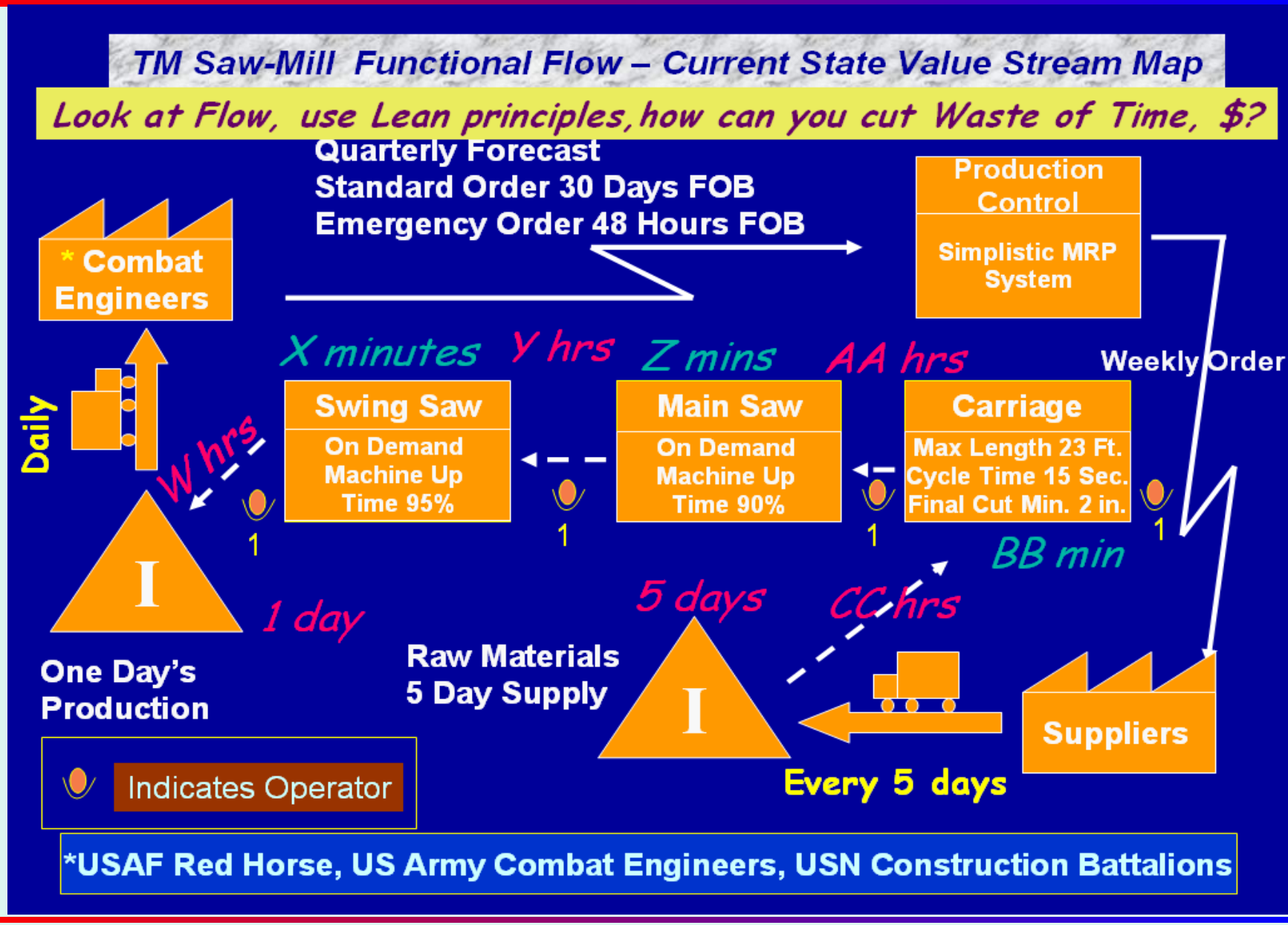
TM Saw-Mill Functional Flow – Current State Value Stream Map
Look at Flow, use Lean principles, how can you cut Waste of Time, $?
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X minutes
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5 days
CC hrs
1 day
One Day's Production
Raw Materials
5 Day Supply
Suppliers
Every 5 days
Indicates Operator
*USAF Red Horse, US Army Combat Engineers, USN Construction Battalions

As you "what if" changes to the Current State Map, you are starting to draft the Future State Map

Some Important Issues to Address When Developing a Future State Map

Takt Time

Supermarket vs. Shipping

Continuous Flow

“Scheduling” Production (Pacemaker)

Production Mix Leveling

Continuous Improvement